itself remain acid. And not only so, but the important process of nitrification, carried on by bacteria whose activity is closely connected with the amount of lime available, is seriously retarded. Leaves become yellow and there is a general nitrogen starvation of all vegetation.

It developed during the course of the investigation that the addition of lime to such soils, even though it improved materially the conditions for plant growth, reduced the acidity only one-third. This result, taken together with the fact that an acid soil need not contain free acid, and the further fact that forest trees do grow on acid soils, makes it plain, in the opinion of the author, that lime is valuable, not because it neutralizes acids, but because it furnishes a substance indispensable to normal plant growth. The conclusion thus reached points definitely to the use of lime as a means of combating smoke injury to vegetation and of rendering denuded areas again able to support plant life.

A supplementary investigation of the effect of metallic poisons in the soil showed that the sensitiveness of plants to these poisons varies greatly. It was found possible to arrange a complete series, leading from those which were seriously affected to those whose growth was definitely improved.—D. H. ROSE.

The living plant

It is with some interest that plant physiologists and ecologists will read GANONG'S[1] new book on *The living plant*. It is the first attempt in English to bring, in a comprehensive way, the main findings of these subjects within reach of the layman. The aims of the volume are well stated in the first paragraph of the preface: "It is not designed as a digest of our present scientific knowledge of plant physiology for the use of experts in the subject, but, in conformity with the aim of the series of which it is a part, it seeks to present to all who have interest to learn an accurate and vivid conception of the principal things in plant life. I was once myself such a learner, and I have tried to write such a book as I would then have delighted to read. It is, in a word, an attempt at that literature of interpretation which was forshadowed by FRANCIS BACON in the fine passage that stands on its dedicatory page."

Aside from the general interest in plants, we have at present a rapidly growing interest in agriculture. This makes the issue of the present clear statement of the principles of plant production especially timely. In this work the author has lived up to his high reputation as a teacher. One is surprised at the clearness and vividness with which he sets forth the main features of plant activity. Aside from presenting the main findings of the subject, the author gives a clear insight into the scientific method in action, for repeatedly he shows the processes by which the conclusions have been reached. He likewise makes clear the large cosmic relations of the subject.

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[1] GANONG, WILLIAM F., The living plant. 8vo. pp. xii+148. *figs. 178*. New York: Henry Holt & Co. 1913.

Citation of a few of the 18 chapter headings will give an idea of the scope and perhaps the viewpoint of the work: (i) "The various ways in which plants appeal to the interests and mind of man"; (ii) "The prevalence of green color in plants, and the reason why it exists"; (iii) "The profound effect on the structure of plants produced by the need of exposure to light"; (iv) "The kinds of work that are done by plants, and the source of their power to do it"; (xii) "The many remarkable arrangements by which plants secure union of the sexes"; (xvii) "The remarkable improvement made in plants by man, and the way he brings it about."

The author pronounces himself a vitalist of a worthy type, "perfectly natural vitalism based on the superior interpretive power of an hypothesis assuming the existence in nature of an *X*-entity, additional to matter and energy, but of the same cosmic rank as they." This is contrasted with "a supernatural vitalism of the theological type." One wonders whether the *X*-entity as defined above would not satisfy any of our present theologians, and whether the distinction is not a matter of words rather than a real difference. It should be stated that the *X*-entity is called in here only to explain the mechanics of development and inheritance. As a matter of fact, the safe position here is that of the agnostic; for we certainly do not know, in spite of assumption and positive statement to the contrary. Nor should we be discouraged by the fact that we have not made great progress in the physico-chemical explanation of development and inheritance, for the fundamental physics and chemistry of the material here involved are little developed. The serious study of the chemistry of proteins has nearly all been within the last two decades, and that of the physics of colloids within a decade. Every treatise on these subjects points out much more that is unknown than is known. The strides we are making in these fields, along with a phase of work that is now only beginning, namely, application of the methods of protein and colloidal physics and chemistry to the study of protoplasm, promise great progress in the immediate future. Here also we should not lose sight of the great contribution of KLEBS and other experimental morphologists. These are the days of hopeful agnosticism in physiology.

One is disappointed at the overworking of adaptation in the book. An adaptational explanation is apparently placed coordinate with the physical or chemical explanation. This may make the book attractive to laymen, but it hardly expresses the present spirit of plant physiology. The book also contains many statements not abreast of our present knowledge. The following sentence savors of INGENHOUSS' original statement: "It vitiates the air by its respiration, but in the long run purifies it still more by its photosynthesis." I believe it is now fully proved that vitiated air does not result from increased carbon dioxide content. Alcoholic fermentation of the yeast is spoken of as giving a copious release of energy available for growth. Also the yeast is said to be unable to respire in any other way. Per weight of sugar used, alcoholic fermentation releases about one-twentieth the energy released by aerobic

respiration, and growth does not generally occur in the yeasts in absence of aerobic respiration. One is also surprised at the author's slighting remark concerning the study of other products of alcoholic fermentation aside from carbon dioxide and alcohol, especially when he calls to mind EHRLICH's recent important contribution on this point.—WILLIAM CROCKER.

NOTES FOR STUDENTS

Current taxonomic literature.—O. AMES (Philip. Jour. Sci. Bot. **7**:125–143. 1912), in continuation of his studies on Philippine orchids, lists 54 species of the genus *Bulbophyllum*, 19 of which are new to science.—A. BERGER (Monats. für Kakteenk. **22**:147, 148. 1912) has published a new species of *Opuntia* (*O. tomentella*) endemic in Guatemala.—A. D. BETTS (Ann. Bot. **26**:795–799. *pls. 75, 76.* 1912) describes and illustrates a new genus and species of bee-hive fungus (*Pericystis alvei*). The fungus grows on the pollen stored in the honeycomb.—E. P. BICKNELL (Bull. Torr. Bot. Club **39**:415–428. 1912) in a tenth article on "The ferns and flowering plants of Nantucket" records further data concerning the Nantucket flora and describes two new species (*Linum intercursum* and *Ilex fastigiata*).—G. BITTER (Rep. Nov. Sp. **11**:1–18, 202–237, 349–394. 1912) in continuation of his studies in the Solanaceae has published several new species and varieties from Central and South America.—F. BÖDEKER (Monats. für Kakteenk. **22**:152–155. 1912) describes and illustrates a new species of *Mamillaria* (*M. Verhaertiana*) probably indigenous in Mexico.—J. BROADHURST (Bull. Torr. Bot. Club **39**:357–385. *pls. 26–29.* 1912) in continuation of her studies in the genus *Struthiopteris* records 15 additional species, 3 of which are new to science, the others being transfers from *Lomaria* or *Blechnum*.—N. E. BROWN (Kew Bull. 281. 1912) describes a new genus (*Thorncroftia*) of the Labiatae from South Africa.—E. CHIOVENDA (Ann. di Botanica **10**:383–415. 1912) under the title "Plantae novae vel minus notae e regione aethiopica" has published several species of flowering plants new to science and proposes the following new genera: *Spathulopetalum* of the Asclepiadaceae and *Negria* of the Gramineae.—T. D. A. COCKERELL (Torreya **12**:244–247. 1912) in an article entitled "*Tragopogon* in Colorado" finds four recognizably distinct forms of this genus in Colorado, including a new hybrid (*T. porrifolius*×*dubius*).—W. G. CRAIB (Kew Bull. 266. 1912) describes a new genus (*Murtonia*) of the Leguminosae from Siam.—E. L. EKMAN (Arkiv für Botanik **11**, no. 4. pp. 61. *pls. 1–4.* 1912) under the title "Beiträge zur Gramineenflora von Misiones" includes 5 new species of grasses from Argentina.—F. FEDDE (Rep. Nov. Sp. **11**:196, 197. 1912) describes 2 new species of *Corydalis* from western North America.—M. L. FERNALD (Rhodora **14**:188–190. 1912) discusses the inland loose-flowered roseate form of "hardhack" and designates it as *Spiraea tomentosa* var. *rosea* (Raf.) Fern.; the same author (*ibid.* 192) also characterizes a hitherto unrecorded form of ash, namely *Fraxinus americana f. iodocarpa* Fern.—L. N. GOODDING (Muhlenbergia **8**:92–94. 1912) under the title "New southwestern ferns" describes 5 new species and one variety from Arizona, New Mexico, and